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UNIVERSITY EXTENSION IN TENNESSEE HIGH SCHOOLS

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Motives.—One who has followed agricultural progress and the part played therein by the U. S. Department of Agriculture and the state agricultural colleges knows that the present problem is to get the knowledge which has accumulated, into a practicable and accepted form for the most conservative as well as the most numerous portion of our population—the farming classes of the present and coming generations. But while this great problem of agricultural instruction is well recognized all over the land, another phase of the subject not less important is not so widely recognized, namely, that agricultural education promises perhaps more for the advancement of education than for the advancement of agriculture merely. And the fact that it is not so recognized leaves the propaganda in the hands of the agriculturists, rather than in the hands of schoolmen, for its pedagogical organization. As a school subject the pedagogy of agriculture has not been worked out.

Training in agriculture, having been classified as a division of the more general subject of industrial education, comes quite naturally to be regarded by schoolmen, trained along the accustomed scholastic lines, as being on a parity with manual training which is rapidly finding a place in our educational system. But this conception of the place or function of agriculture in the curriculum is wholly inadequate. For while manual training, aside from its general cultural value in the schools, aims only to train for a vocation, agriculture, aside from its cultural value for the student of whatever future calling, must, in its purely practical aspect, include a great deal more than a vocation. It is not only a business but a mode of life, and no preparation

for that mode of life could be complete that does not include not only farm husbandry, or agriculture in its strictest sense, but also much of the manual training peculiar to rural pursuits, hygiene and agricultural economics and even rural society, education, and general culture. Where the skilled mechanic or engineer of the city has his amusements, avocations, and daily interests, aside from his profession, provided by sports, theaters, libraries, lectures, art galleries, parks, clubs, and business intimacies, the farmer must provide not only his living but to a large extent all those things which make life worth living.

Citizenship of the highest type and not simply agricultural skill should be the practical goal of agricultural education. This ideal of education for the children of rural communities is far reaching and involves some deep-seated changes, not so much of the subjects to be taught as of the point of view from which to present them. The teacher will consider that pupils living in a rural environment should be taught how to make the most of that environment.

This conception of the place of agriculture in the elementary and high schools is given to explain the motive which prompted the writer in the inauguration of a new line of agricultural instruction in co-operation with the county high schools of the state of Tennessee while in charge of the department of agricultural education of the state university. The purpose, it will be noted, was not to lead students from the schools to the university more than would any other general educational cause, but to aid in the inauguration in the county high schools, of work now to be had only in the agricultural colleges of the land, and in response to a demand of the high schools for such work. It merely meant utilization in the child's education of the things most familiar to him, leaving it to each individual to decide whether he shall make a practical application of this training as a farmer, or accept it for the cultural value which all may get from it.

Organization.—The work offered consisted of a course running to the end of the school year, in the hands of the regular high-school faculty and given a place on the school programme

as definitely established as the other high-school subjects. The part of the writer was to go each month to each of the schools maintaining the course, to give a lesson and demonstration, to outline the work, and to suggest readings and reviews. Each lesson in turn presupposed the mastering of all former lessons, thus making the work cumulative and capable of increasing technicality.

Heretofore agricultural extension has been on a very different plan. To quote from John Hamilton, farmers' institute specialist of the U. S. Department of Agriculture, the farmers' institute has given adult instruction to experienced farmers and has suffered from there having been "too little time devoted to instruction in each locality" and "too little work done by the scholars." The work has been of value chiefly in giving a desire for more and better instruction, and this present plan was to satisfy that demand as voiced by those communities which desired the work in a better organized form through the medium of their schools. It had the advantage of regularity and progressive development, thus starting from the more elementary principles and gradually assuming a more scientific aspect. The importance of instructing youth rather than adults, of meeting the same audience on each successive visit, and of utilizing the government, equipment, and studious atmosphere of the established schools is also apparent.

The following conditions were asked of the schools desiring the work. Each school was asked to assume the responsibility for success of the work; to provide it a regular place on the programme; to assign the class to a member of the faculty to attend to demonstrations which require some time for their operation, and to see that the class did the assigned readings and reviews and kept notes of all instruction; to plan a continuation of the course from year to year so long as the university should offer co-operation; and, finally, to maintain the work independent of this connection as soon as the finances of the school and other conditions should justify it.

The expense to the school was nominal, a minimum of ten dollars being prerequisite, to be spent by the school for neces-

sary materials at suggestion of the visitor, which did not include any pay for services.

Operation.—Announcements of the plan and purposes of the work having been made by publication and circular letter, eleven of the most promising of the high schools applying for the course were selected throughout the state as being enough for one visitor to manage, and the remainder put on a waiting list to be considered later when it might be found expedient to drop any of the favored ones or when the university might be able to put more visitors into the work. Through no fault of their own two of the schools were later dropped, leaving the following nine schools, all but one being county high schools—the name being that of the city or village where located and the figures indicating the number of pupils taking the work at the several places: Newport (100); Madisonville (125); Sparta (150); Lawrenceburg (140); Ashland City (65); Paris (110); Arlington (50); Millington (80); Ripley (31). The first-named school is in the foothills of the Great Smokies near the North Carolina line and the last is near the Mississippi River. Of the total (850) pupils taking the work about 350 were held by the teachers of the several schools for the same mastery of this as of other school work.

The time required of the visitor was about a week for each of the two long trips and two days for the two short trips made from the university, going to the latter in the morning and returning the same day. Following the oral presentation of each lesson it was later put into a printed form with cuts and diagrams, published in a student publication of the agricultural college and mailed to each of the eleven schools for the guidance of teacher and pupils. In order to open the subject with concrete materials corn was used. The series began with morphology of the ear, bulletins from Pennsylvania, Illinois, Connecticut, Missouri, the U. S. Department of Agriculture (3), and the Office of Experiment Stations being left with the schools for study of that and the following lessons. This was followed by the making of a seed-corn tester, after Professor Holden's plan, and the testing of seed corn. Next in order was given a

lesson on fertility and fertilizers, the school running a flower-pot test of corn seedlings in washed sand to illustrate mineral elements necessary for plant growth and another with soja bean seedlings in washed and sterilized sand to illustrate fixation of nitrogen by legumes and the necessity of inoculation. Finally, the structure and composition of the corn kernel was studied by use of charts and reagents. The test for starch in the commercial form, in the green leaf, and in the kernel, brought out the significance of photosynthesis, and the identification of starch, oil, and protein in the kernel opened the subject of foods and rations.

Since few of these schools had any apparatus, such materials as were to be used were carried from the university in a suit case and a neat wooden box 10×7×19 inches with a handle at the top. The following includes most of the materials carried on the different trips:

Ears of corn illustrating merits, defects, and standard varieties,
Muslin for seed tester,
16 samples of fertilizers and salts of plant foods,
20 samples of commercial corn products in bottles,
Soja beans, soaked corn, and corn seedlings,
Pericardium of a beef,
Solution for inoculating soja beans,
Potassium permanganate, nitric acid, and iodine solution,
Alcohol and alcohol lamp,
Beakers, thistle tube, dinner plate, pane of glass.

Thus by means of corn the following important scientific subjects were introduced and briefly treated:

Acids, bases, and salts, and solution,
Osmose, physical and nutritive,
Plant foods and feeding,
Cell structure and function,
Structure and function of root, stem, and leaf,
Photosynthesis,
Rôle in plant life and cycle in nature of carbon, nitrogen, water, and minerals,
Animal nutrition.

And correlated with the foregoing the following agricultural subjects were treated :

Morphological and varietal merits of corn,
Selection of seed, viability of seed,
Breeding,
Soil fertility and fertilizer economy,
Fuel value of food,
Balancing rations.

Visits were usually advertised in local papers so that usually a number of outsiders were present, consisting of teachers, farmers, and school patrons. Extra meetings of teachers were sometimes arranged for especially at the end of the week.

Possibilities.—This plan contemplated some other features worthy of mention. As the teachers having local charge of the work in the different schools were mostly of more than ordinary ability but, like most high-school teachers, generally without any experience in such work, not the least important purpose of the work was the coaching of each teacher in his environment and subject to his local limitations of equipment, time, and co-operation of pupils and patrons. This met the not uncommon difficulty which teachers sometimes have in applying to local conditions, which may be far from ideal, methods and instruction acquired under ideal conditions of normal or college. The plan was also calculated to build up an agricultural teaching force and sentiment in the state without attempting to revolutionize school curricula and organization. It also contemplated the organization during the summer vacation of a class at the university consisting, as far as might be, of the same teachers and under the same leader, in a laboratory that should be a model of economy and convenience, in order that they might thus learn by experiment the need and use of apparatus necessary for the best teaching of agriculture and its related sciences. There was also contemplated the expansion of the visiting force by putting into service university students of agricultural education who, after being drilled in the department, might be put "on the road" each alternate week of their course.

On the part of the university this plan entails the expense of the visitor until such time as the demand for his services might enable it to unload all or a part of it upon the schools profiting from the arrangement. Against this it has the advantage of standardizing from the university the secondary agricultural instruction of the state. Should high schools generally accede to the reiterated request of the agricultural colleges in their propaganda for agriculture in the schools, and proceed to put in courses, each after its own idea of the work, the only standard which the university could set up for admission credits would be so low as to be no standard at all. It is therefore "up to" the university to set up a standard and assist in making it possible for the high school to meet it, or to say less about it. And finally, of no less importance to a university whose presumed position as head of the public school system of its state is recent or not generally recognized, is the chance this kind of work gives for putting the entire state under a lasting obligation to it and of facing all of the high schools of the state in its direction. Here the high schools' necessity is the university's opportunity.